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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 01 MAR. 2005
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Applicant's or agent's file reference PH-20159-PCT		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/KR2003/001966	International filing date (day/month/year) 26 SEPTEMBER 2003 (26.09.2003)	Priority date (day/month/year) 27 SEPTEMBER 2002 (27.09.2002)	
International Patent Classification (IPC) or national classification and IPC IPC7 B22D 11/112			
Applicant POSTECH FOUNDATION et al			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>3</u> sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 			
Date of submission of the demand 09 MARCH 2004 (09.03.2004)		Date of completion of this report 25 JANUARY 2005 (25.01.2005)	
Name and mailing address of the IPEA/KR  Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140		Authorized officer NA, Dong Kyu Telephone No. 82-42-481-5468 	

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/KR2003/001966

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☐ the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement) under Article 19
pages _____, filed with the demand
pages 14, 15, filed with the letter of 18 January, 2005
- ☐ the drawings:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☒ the claims, Nos. 7-14, 16
- ☐ the drawings, sheets _____

5.

- ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed," and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION

International application No.

PCT/KR2003/001966

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-9	YES
	Claims	NO
Inventive step (IS)	Claims 1-9	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-9	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

1. Amendment

This statement is based on the amended claims 1-9 filed with the letter of January 18, 2005. Claim 1 is amended to incorporate parts of claim 6. Claims 7-14 are cancelled. Claim 15 is renumbered into claim 7 and amended to be dependent upon claim 1. Claim 16 is cancelled. Claim 17 and claim 18 are renumbered into claim 8 and claim 9, respectively. The scope of these claims have not been extended beyond the disclosure of the patent application as filed.

2. Novelty and Inventive Step

Reference is made to the following documents:

D1: JP 54-161564 (21 December 1979)

D2: JP 57-112954 (14 July 1982)

The invention as defined in claim 1 is a method for producing a bulk amorphous alloy sheet, with two rolls which rotate in an opposite direction to each other, and each of which is provided with heat exchange means, wherein the rotation rate of the two rolls is in the range of 1 to 10 cm/sec and the gap between the two rolls is in the range of 0.5 to 20mm. Claims 2 to 7 are dependent on claim 1. Claim 8 claims a bulk amorphous alloy sheet prepared by the method according to any one of claims 1-7. Claim 9 is the bulk amorphous alloy sheet according to claim 8, which has thickness of 0.5 to 20mm.

D1 shows that two rolls with different diameters are combined to manufacture an amorphous material. D2 discloses a cooling roll having a cooling water passage formed between the outside surface of an inner roll and the inside circumferential surface of the body.

No individual citations disclose the rotation rate of rolls and the gap between the two rolls (PCT Article 33(2)). Also, the subject matter of claims 1 to 9 seems to be inventive since neither D1 nor D2 teaches or fairly suggests the rotation rate of rolls and the gap between the two rolls (PCT Article 33(3)).

3. Industrial applicability

Claims 1 to 9 are considered to be industrially applicable (PCT Article 33(4)).

What is claimed is:

1. (Amended) A method for producing a bulk amorphous alloy sheet, the method comprising:
preparing a melt containing alloy components;
5 feeding the melt directly into a gap defined between two rolls, which rotate in opposite direction to each other, and each of which is provided with heat exchange means; and
cooling the melt at a cooling rate higher than the critical cooling rate for transformation of the melt into an amorphous solid phase, when
10 the melt passes through the gap defined between the two rolls,
wherein the rotation rate of the two rolls is in the range of 1 to 10 cm/sec, and the gap between the two rolls is in the range of 0.5 to 20 mm.
- 15 2. The method according to claim 1, wherein the step of preparing the melt is carried out in an inert atmosphere.
3. The method according to claim 1, wherein the heat exchange means is a circuit for flow of a cooling fluid.
- 20 4. The method according to claim 3, wherein the cooling fluid is cooling water or cooling oil.
5. The method according to claim 1, wherein the two rolls are
25 made of a copper-based alloy containing material.
6. (Amended) The method according to claim 1, wherein the temperature of the melt to be fed into the gap defined between the two rolls is in the range of 500 to 1,500 °C, the surface temperature of the two
30 rolls is in the range of 15 to 30 °C.

7. (Amended) The method according to claim 1, wherein the two rolls are arranged in such a manner that an angle defined by the horizontal and a straight line connecting the respective rotation centers of the two rolls, is in the range of 0 to 90 degrees.

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8. (Amended) A bulk amorphous alloy sheet prepared by the method according to any one of claim 1-7.

9. (Amended) The bulk amorphous alloy sheet according to
10 claims 8, which has a thickness of 0.5 to 20 mm.

Abstract of the Invention

The present invention provides a method for producing a bulk amorphous alloy sheet with high quality at low production cost, by which an alloy melt can be directly transformed into a sheet form without using
5 other additional processes. The method comprises preparing a melt containing alloy components; feeding the melt into a gap defined between two rolls, which rotate in opposite direction to each other, and each of which is provided with heat exchange means; and cooling the melt at a cooling rate higher than the critical cooling rate for
10 transformation of the melt into an amorphous solid phase, when the melt passes through the gap defined between the two rolls. The present invention also provides an apparatus for producing a bulk amorphous alloy sheet with high quality at low production cost, and a bulk amorphous alloy sheet.

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